

ABSTRACT

An apparatus and a method for the generation of high-energy terahertz radiation. The apparatus and method function by impinging optical radiation on the surface of a semiconductor substrate, creating a photo-generated dipole emitting terahertz radiation. Because it is desirable to orient the dipole perpendicular to the radiation direction to maximize the power of the terahertz radiation, the surface of the semiconductor is modified to achieve this desirable result . More specifically, three embodiments of the surface modification are disclosed: (1) a grating is created in the top surface of a GaAs semiconductor substrate, (2) an InAs film is formed on a Teflon base to create a grating structure on the semiconductor substrate, and (3) a grating is disposed in the surface of the semiconductor substrate such that the optical radiation engages the substrate at Brewster's angle.